## MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

# IT Cooling PRODUCT OVERVIEW

- **CLOSE CONTROL AIR CONDITIONERS**
- **EVAPORATIVE COOLING SYSTEM**
- AIR CONDITIONERS FOR HIGH DENSITY RACKS AND BLADE SERVERS
- **DATA CENTER INFRASTRUCTURE**
- **CHILLERS**
- **TELECOM SOLUTIONS**
- > CONTROL, SUPERVISION AND OPTIMISATION SYSTEMS
- UNITS FOR SIMULTANEOUS AND INDEPENDENT PRODUCTION OF HOT AND COLD WATER



## **CLIMAVENETA'S MISSION**



With over 50 years experience in the HVAC industry, Climaveneta has been a major player widely recognized for its leadership in IT Cooling solutions. Building on this strong legacy, Mitsubishi Electric Hydronics & IT Cooling Systems SpA has decided to turn Climaveneta into the Group's specialized brand for data center cooling, merging the experience of Climaveneta with RC's in this segment.

The result is a brand new business organisation providing the most complete product range, which combines the best technologies, solutions and innovations from RC and Climaveneta companies. This is enhanced by both brands' extensive experience, and by the advantages of integrated R&D, operations and central functions.

Over 50 years of experience

**Dedicated products** & specialized solutions

specialized manufacturing hubs

Worldwide distribution and service network

Sales network

Manufacturing hubs or R&D labs

and testing labs in Italy, 8 R&D and testing labs China and India Vast portfolio of proprietary & patented technologies

COUNTLESS SUCCESSFUL PROJECTS WORLDWIDE



Wiit Spa - Milano, Italy Tier IV certified

**Data Center proRZ** Munich, Germany





CLIMAVENETA IT COOLING leading-edge cooling technologies and solutions for IT applications are designed to provide even the most challenging Data Center and Telecom projects with:



# Smart integration of the most advanced technologies



Building on the experience of RC Group and Climaveneta companies both on HPAC and on chillers, Climaveneta IT Cooling solutions offer the smartest combination of the most advanced technologies such as: full inverter concept, free cooling, heat recovery management, adiabatic cooling.

## Reduced operating costs



In infrastructures working 24 hours per day, 365 days per year, over an average of 10 years, every energy improvement allows for a significant reduction in OPEX (operating costs).

## Complete reliability and extended lifetime



The uptime of server infrastructure and hence of most critical services in modern society, is tightly related to the reliability of the IT cooling system, which must guarantee Tier IV uptime standards over its whole lifetime.

## Widest use of the available power capacity



In all installations were power feeds are at capacity, the key option to expand data center facilities is to significantly improve the energy performance of the whole data center.

## Optimised footprint



A green, high efficiency approach to data centers is key also to enable a more effective use of available space thus delaying the need of building new rooms.

## Increased sustainability



Intelligent energy management is crucial also for sustainability, considering the growing impact of data center industry in terms of total CO2 emissions.

more on: www.climaveneta.com











#### **CLOSE CONTROL AIR CONDITIONERS**



- ▶ Highest energy efficiency
- Total dependability
- Ideal for high temp. IT environments









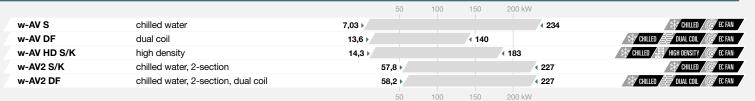




#### Direct expansion close control units

			50	100	150 kW	
b-AV DX / t-AV DX	with remote air cooled condenser	6,37 ▶			<b>◆ 149</b>	AIR COOLED AXIAL EC FAN
b-AV DW / t-AV DW	with built-in water cooled condenser	7,89 >			<b>◆ 156</b>	WATER COOLED AXIAL EC FAN
t-AV DF DX	dual fluid / air cooled	12,2 >			<b>136</b>	AIR COOLED 🚁 DUAL FLUID 🕼 EC FAN
t-AV DF DW	dual fluid / water cooled	11,2 >			₹ 145	√¥ WATER COOLED 🎊 DUAL FLUID / 🚱 EC FAN
t-AV FC DW	free cooling / water cooled	7,88 >			<b>157</b>	WATER COOLED FREE COOLING FEE FAN
i-AV DX	inverter compr./ with remote air cooled condenser	10,4 🕨			∢ 135	INVERTER AIR COOLED FE FAN
i-AV DW	inverter compr./with built-in water cooled condenser	11 →			<b>140</b>	INVERTER A WATER COOLED C EC FAN
i-AV DF DX	inverter compr./dual fluid/air cooled	12,3 >			◀ 142	INVERTER AIR COOLED AND DUAL FLUID FE FAN
i-AV DF DW	inverter compr./dual fluid/water cooled	12,3 >			<b>◆ 147</b>	INVERTER WATER COOLED * DUAL FLUID EC FAN
i-AV FC DW	inverter compr./free cooling/water cooled	11 →			140	INVERTER WATER COOLED FREE COOLING C EC FAN

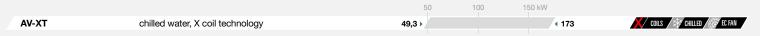
#### Chilled water close control units



#### Close control units for low thermal load applications



#### Close control units for high temperature, high Delta T



#### Close control units with displacement air delivery

		10 20	30 40 50 kW	
t-AV DL DX	with remote air cooled condenser	7,63 >	<b>√ 42,6</b>	AIR COOLED EC FAN
w-AV DL	chilled water	11,6 >	<b>41,3</b>	CHILLED EC FAN
i-AV DL DX	inverter compr. / with remote air cooled cond.	21,7 >	<b>√ 53</b>	INVERTER AIR COOLED FE FAN

#### REMOTE CONDENSERS AND DRY COOLERS

			50	100	150	200	250	300 kW	
BVE DX-A	air cooled remote condenser with AC axial fans	9,50 >						∢ 302	OUTDOOR AXIAL
BVE DX-E	air cooled remote condenser with EC axial fans	9,50 >						∢ 302	OUTDOOR & EC AXIAL
BVE DX-PF-E	air cooled remote condenser with EC plug fans	9,90 >			4	156			OUTDOOR CENTRIE.
BVE DC-A	dry cooler with AC axial fans	6,40 >				172 €			OUTDOOR AXIAL
BVE DC-PF-E	dry cooler with EC plug fans	6,80 ▶		₹ 89					OUTDOOR OF CENTRIE.
				100	150	000	050	000 1444	

## ADVANCED TECHNOLOGIES FOR EFFICIENT DATA CENTERS

Climaveneta IT Cooling leadership in data center cooling systems is backed by 50 years of experience in the smart integration of premium technologies for complex IT cooling projects.



#### **Magnetic Levitation**

An extended range of chillers with magnetic levitation centrifugal compressors from 200kW to 4MW, both air source and water source, available also in free cooling and evaporative free cooling versions, to deliver highest efficiency in every application.

#### AIR CONDITIONERS FOR HIGH DENSITY RACKS AND BLADE SERVERS



- Maximization of the internal capacity of the infrastructure
- ► Elimination of hot spots
- Minimum floorspace occupancy





#### Close-coupled air conditioners

CRCX	direct expansion with remote air cooled condenser	8,81 >		<b>∢</b> 68,4	AIR COOLED EC FAN
CRCC	chilled water	16,1 >		₹ 74,7	CHILLED & EC FAN CEC AXIAL
CRCD	direct expansion / dual fluid	9,53 > 17,7			DUAL FLUID GEC FAN
CRCF	direct expansion / free cooling	11,1 > 14,6			FREE COOLING Soff AIR COOLED FE FAIL FE AXIAL
CRCX ROW	direct expansion / with integrated compressor	23,5 >	∢ 37,1		AIR COOLED EC FAN
CCD	chilled water unit for in-rack conditioning	26,6 >	∢ 39,1		CHILLED AXIAL & EC AXIAL
		20	40	60 kW	

#### **DATA CENTER INFRASTRUCTURE**

#### **▶ RACK**

High quality cabinets for the protection and housing of servers

#### AISLE CONTAINMENT

Aisle Containment solutions for high density applications

#### **PDUs**

Premium Rack Power Technology

#### RAISED FLOORS

Raised floor solutions for high efficiency data centers



Floor-standing cabinets suitable for the housing of the server. The supporting structure is made of sheet steel with a thickness of 20/10 and can reach a capacity of 2000 kg.



Aisle Containment solutions for the physical separation of the hot and cold air streams.



Power distribution units (PDUs) that manage power usage for servers, storage and network equipment.



The raised floor is designed to easily adapt to future evolutions of IT spaces, avoiding expensive building work. This solution fulfills the need for versatile design of data centers.

#### **EVAPORATIVE COOLING SYSTEMS**



- Variable air flow and cooling capacity
- ▶ Fully aluminum structure (20-year warranty against corrosion)
- Low pPUE index: 1,025



#### 2-Stage indirect evaporative cooling system for large data centers

100 150 200 250 300 kW

EVIS evaporative cooling system 80 (320)



#### **Active Free Cooling**

An advanced free cooling system available both as direct and indirect free cooling (no glycol), to exploit the outdoor air to cool the data center.



#### **Smart Thermal Energy Management**

An innovative heat recovery system that allows the smart use of rejection heat from the data center for comfort heating and other neighbouring applications.



#### **Active Redundancy**

Real active redundancy delivered through the combined adoption of innovative EC PUL fans, inverter DC brushless compressors and a smart algorithm that balances heating load also among stand-by units.

#### **CHILLERS**



- ▶ Highest energy efficiency
- ▶ Ideal for IT environments
- Lowest noise emissions





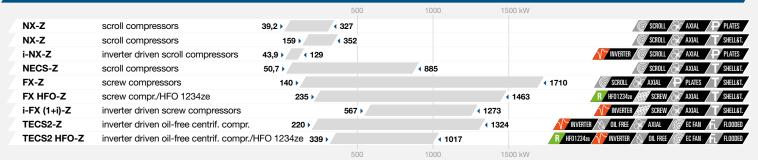




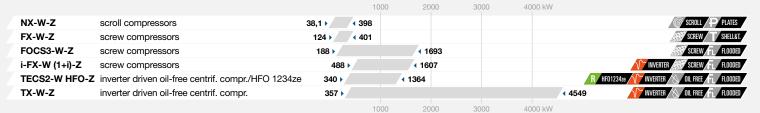




#### Air cooled chillers



#### Water cooled chillers



#### Condenserless chillers

			500	1000	1500	2000 KW	
HE-Z	scroll compressors	4,70 ▶ ◀ 32,4					SCROLL PLATES
NECS-ME-Z	scroll compressors	39,5 ▶	432				SCROLL P PLATES
FOCS-ME-Z	screw compressors	79,2 ▶				₹ 2240	SCREW SHELL&T.
			500	1000	1500	0000 1144	

#### Air cooled chillers with free-cooling technology

			500	1000	1500 kW	
NECS-FC-Z	scroll compressors	41,5 >	4 477			SCROLL AXIAL PLATES
FX-FC-Z	screw compressors	332 >			1450	SCREW AXIAL T SHELL&T.
TECS-FC-Z	inverter driven oil-free centrif. compr.	302 >			<b>√</b> 1693	OIL FREE C FAN FL FLOODED

#### Air cooled chillers with evaporative free-cooling technology

				1000		
FX-EFC-Z	screw compressors	330 ▶		4	1441	SCREW AXIAL SHELL&T.
TECS-EFC-Z	inverter driven oil-free centrif. compr.	300 ▶			◀ 1682	OIL FREE C AXIAL FL FLOODED
			F00 d	1000	500 1444	

#### **ANCILLARY PRODUCTS**



#### Remote condensers

		200	400	600	800 KW	
NHCR / NCE / FCE	7,90 ▶				∢ 929	AXIAL





#### **Evaporative Cooling**

The latest AHR solution with 2-stage indirect adiabatic free-cooling section. pPUE down to 1.025.



- ADAPTIVE

#### Adaptive set point

An advanced algorithm instantaneously detects the real thermal loads of indoor units and conveys this information to chiller, for selection of the most efficient operating mode (e.g. dynamic variation of chillers et points and operating mode, free cooling mode, active redundancy mode).

#### X-type System

The revolutionary double stage design applied to the heat exchangers in order to achieve top level efficiency and pPUE levels down to 1,07.



#### **TELECOM SOLUTIONS**



- Reliability and extended operation
- High capacity sensitive cooling
- Black out management







#### Air conditioners for telecom applications with free-cooling and full DC inverter technology

			5	10	15 2	0 kW	
MED	packaged for outdoor installation 1,95 >					<b>₹ 20,6</b>	OUTDOOR CENTRIE. CE FAN
i-MED	packaged for outdoor installation / inverter techn.		8,56 >		∢ 17,6	$\Lambda$	INVERTER OUTDOOR CENTRIE CE FAN
MID	packaged for indoor installation 1,95 >				<b>14,8</b>		INDOOR CENTRIE CE FAN
i-MID	packaged for indoor installation /inverer techn.		8,51 >		∢ 18,1		INVERTER INDOOR CENTRIE CE FAN
HCAT	split system / ceiling or wall installation	4,94 >			4 16,8		WALL INSTALLATION CENTRIF. CE FAN
i-HCAT	split system / ceiling or wall installation /inverter ted	ch.	8,64 >		<b>√ 17,3</b>	INVERTE	R WALL INSTALLATION CENTRIE C FAN

## UNITS FOR SIMULTANEOUS AND INDEPENDENT PRODUCTION OF HOT AND COLD WATER



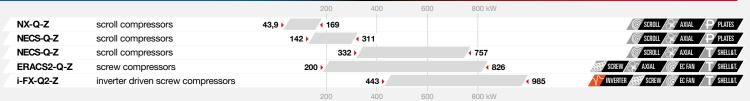
- Smart heat recovery system
- A single unit for multiple uses
- System simplification







#### Air source heat pumps



#### Water source heat pumps

	50	100	150	200	250	300 KVV	
NECS-WQ-Z scroll compressors	48,4					<b>4</b> 284	SCROLL PLATES
ERACS2-WQ-Z screw compressors			189	) <b>,</b>		<b>4</b> 318	SCREW SHELL&T.
	F0	100	150	200	250	300 14/1/	

# CONTROL, SUPERVISION AND OPTIMISATION SYSTEMS





#### **Group devices**

#### ▶ ClimaPRO DCO Plant Room Optimisation System

Plant Room Optimiser for real time, smart management of energy indeces for the single units and the entire plant room.

DATA CENTRE MANAGER Specialized group control for the data center air conditioners.





#### Supervision and monitoring systems

- FWS3 / FWS3000
- Remote monitoring systems.
- CV Cloud

Cloud based remote monitoring system.

WS3000

Remote monitoring system for service and proactive maintenance.

#### **Human Machine Interfaces**

▶ KIPlink

Control interface for smart phones and tablets.



#### **Inverter Driven Compressor**

The possibility to modulate cooling capacity results in increased efficiency as well as in the possibility to effectively implement smart management solutions such as active redundancy.



#### **Green HFO Refrigerants**

Following on vast experience in using green refrigerants, Climaveneta has already employed extensively green HFO refrigerants such as HFO1234ze and HFO1234yf in many ranges, in order to continue to be at the forefront with green best practices.



#### V-AIR

High efficiency EC technology fans are extensively adopted for their advantages both in internal units as well as in remote condensers with energy reduction up to 15% compared to traditional EC fans.





Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

## MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

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